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ON THE PRESENT CONDITION OF THE EXISTING HERDS OF BRITISH WILD WHITE CATTLE.*

THIS Report does not include extinct herds, but as one herd—that in Lyme Park—has only very recently ceased to exist, and as this is the first account of the Wild Cattle published since that catastrophe, it has been thought well to include a short notice of that ancient stock.

The following list includes all the herds now remaining in the British Isles, arranged according to the probable order in time of their arrival at their present abode. In the detailed account of the different herds further on, they are arranged to some extent geographically, from north to south.

Chartley Park, near Uttoxeter, Staffordshire (Earl Ferrers), appears to have been enclosed by the middle of the thirteenth century.

Chillingham Park, near Belford, Northumberland (Earl of Tankerville), seems to have been enclosed before the latter part of the same century, and possibly before 1220.†

* Report of the Committee, consisting of Mr. E. Bidwell, Prof. Boyd Dawkins, Prof. Bridge, Mr. A. H. Cocks, Mr. E. de Hamel, Mr. J. E. Harting, Prof. Milnes Marshall, Dr. Muirhead, Dr. Sclater, Canon Tristram, and Mr. W. R. Hughes (Secretary), appointed by the British Association for the purpose of preparing a Report on the Herds of Wild White Cattle at present existing in Great Britain. Read at Manchester, Sept. 1887.

† For these dates see the authorities quoted by Harting, 'Extinct British Animals,' pp. 230—232.



Lyme Park, near Disley, Cheshire (Mr. W. J. Legh), at the latter part of the fourteenth century.

Cadzow Park, Hamilton, Lanarkshire (Duke of Hamilton). Date of enclosure unknown, but the present park occupies a portion of the old Caledonian Forest, in which Robert Bruce is traditionally stated to have hunted the Wild Bull in 1320, and where in 1500 James IV. of Scotland took part in the same wild sport.

The above are probably the only herds remaining on the ground on which they were originally enclosed.

Somerford Park, near Congleton, Cheshire (Sir Charles W. Shakerley, Bart.). The cattle cannot be traced here more than about 200 years, though it is possible they have been here since the original enclosure of the park; it is perhaps more likely that they were brought in the seventeenth century from Middleton Park, Lancashire, from a herd which in turn is supposed to have come from Whalley Abbey.

The Middleton herd is now represented by offshoots (to some extent cross-bred, however, and now, like the Somerford herd, domesticated) at Blickling, near Aylsham, Norfolk (Marchioness of Lothian), and at Woodbastwick Hall, near Norwich (Mr. A. Cator). The cattle were removed from Middleton about 1765 to Gunton Park, Norwich (Lord Suffield), where they became extinct in 1853; but some had meanwhile—*viz.* between 1793 and 1810*—been introduced to Blickling, and others in 1840 were sold to Mr. Cator, of Woodbastwick.

The herd at Vaynol, near Carnarvon (Mr. G. W. Duff-Assheton-Smith), was started in 1872 from stock purchased from Sir John Powlett Orde, of Kilmory House, Argyllshire. This stock (see pp. 411, 412) was originally at Blair Athol, Perthshire. In 1834 the herd was sold to the Marquis of Breadalbane, Taymouth, and to the Duke of Buccleuch, Dalkeith. When the latter herd was broken up, the late Sir John Orde purchased the only survivor and transported it to Argyllshire. In 1886 the entire remainder of the Kilmory herd was transferred to Vaynol, and incorporated with those already there.

At Hamilton, Chartley, and Somerford, persons who have known the herds for a number of years have expressed the opinion

* Storer, 'Wild White Cattle,' p. 307.

that the cattle have somewhat deteriorated in size within their recollection; but there is nothing to prove this, and it must be remembered that by degrees things appear smaller than the recollection of the first impression received as children.

At Chillingham, Chartley, and Hamilton, the heads seem slightly larger in proportion to their bodies than in ordinary cattle, the feet larger and broader, and the legs stouter. May not these be taken as indications of a certain amount of deterioration in their size? At Chillingham the cattle have a "fine-drawn" almost "washed-out" appearance, which may be considered as the result of close breeding, and the fact of more male than female calves being born is probably the effect of the same cause. It is interesting to note that in the semi- or wholly-domesticated herds at Vaynol, Somerford, and Woodbastwick, the calves are extremely shy when first born, and only become accustomed to human beings by degrees.

If it is not beyond our province to make a suggestion, it would be extremely interesting if the noble owners of the three ancient herds would co-operate with some other owner of a large park—if haply such could be found—willing to undertake the following experiment:—Namely, that all calves which would ordinarily be converted into veal or steers should instead be sent to build up a new herd, which, combining the blood of the only remaining ancient herds, and with no artificial selection exercised, might be expected to revert more nearly to the aboriginal wild type than could be achieved in any other manner.

HAMILTON (CADZOW).—On August 22nd last this herd was made up as follows:—Bulls: 2, six years old; 1, five years old; 2, three years old; 6, two years old; five calves; total, 16 bulls. Females: 25 cows, four years old and upwards; 10 heifers, two years old; 9 yearlings and calves; total, 44 females. Total, 60 head (against 54 at the beginning of the year). The coloration and markings are tolerably uniform, though ten years ago, at any rate, there was a variety in the amount of black on the outside of the ears, and in a slight degree in the amount on the muzzle. Any that are defective in their points are slaughtered or made into steers; there are none of the latter at the present moment in the park, but two were shot last October, and some of the young bulls will be operated on in the fall. There is a good deal of black on the fore legs in this herd, the hoofs are black, also tips

of horns, roof of mouth, and circle round eyes; black calves are frequently born—ten years ago the average was about three annually. Three years ago a bull, which was considered as a Highland bull, arrived from Kilmory; it was marked precisely like the Hamilton cattle, but one of its progeny was white all over, and another was black, so the bull and all its stock were killed. The new blood was introduced in consequence of an idea prevailing that the breed was deteriorating from too close breeding. Last year (1886) a bull was procured from Chillingham, and perhaps greater interest attaches to the result of this admixture of blood than any other event in connection with the white herds of recent years. The first two calves were born in March last, and three others somewhat later. Four of these were males, and only one a female. Three of the bull calves took after their sire in having brown ears, and have been destroyed. The remaining bull calf is described as beautifully marked, with black points after the Hamilton pattern. The heifer calf has her ears slightly tipped with a few brown hairs, but the keeper thinks she may throw well-marked calves by a Cadzow bull. There is no certain evidence of new blood having previously been introduced into this herd, however unlikely it is (as shown by Storer) that a small number of cattle could have been continually bred only *inter se* for centuries, and the herd still exist. But Sir John Orde was told that one, if not two, Highland bulls bred in the herd some years ago. With regard to what has been recorded as to this herd being formerly polled, the following appears to be fresh evidence:—Joseph Dunbar, a labourer who has been in the ducal service for about fifty years, says that forty-five years ago (say, 1842) the cattle were all hornless, and the present Duke's grandfather caused all showing the least appearance of being horned to be killed. The calves are all born here in spring and early summer; to insure this the bulls are kept in a run apart from the cows during the greater part of the year. At the present time the Chillingham bull is in a third enclosure with seven cows (in March the Chillingham bull was by himself, and the ten calves then in existence, in a fourth enclosure). When the grass is scanty, hay and turnips are given, and the cows in addition get a little cotton-seed cake. The keeper (Scott), who has known them for upwards of twenty years, says they are much less wild and dangerous now than formerly, in consequence of being visited by so many people of late years.

CHILLINGHAM.—In October last this herd numbered sixty animals, which has been the average number for the last twenty-three years, though Lord Tankerville wishes to raise the number to 70, which would suffice for the extent of the park. During the period named, 113 male calves and 105 females have been dropped, averaging over nine a year. The deaths have averaged about ten annually. The causes of death, besides the shooting of oxen and an occasional aged or sickly bull or cow, include old age, drowning, injuries received in fighting, rupture, cancer, fall, and other injuries; poverty and want of food; and, in calves, the failure of the dams' milk. The cattle live on good terms with the Red-deer, but will not tolerate the Fallow-deer or sheep in the park, possibly because they eat the pasture too close. They never will touch turnips. During the last few winters ensilage has been given them along with the hay, but for a long time none of them would eat it. They sniffed at it and turned away, and it remained untouched, even when all the hay had been eaten. At length a young bull was seen to try the ensilage; he went back to the herd, and they returned to the ensilage with him. Since then it has always been finished before the hay is attacked. It is not thought prudent to give too much ensilage, as it appears to stimulate the milk in the cows too much for a time, and it afterwards fails. One difficulty in increasing the herd is that the cows continue to suckle their calf even after a second calf is born, and the latter is consequently left to starve. The calves dropped in winter suffer from want of milk. The herd is subject to sudden panics, owing to strangers frightening them purposely to see them run, and several calves have been trodden to death in these stampedes. Drowning in the marshes has been a frequent cause of death in wet winters and during thaws. It is denied that any calves are now coloured otherwise than the correct white, with black extending very slightly beyond the naked part of the nose, and red ears; though in Bewick's time (towards the end of the last century) there were some with black ears, and from the steward's book in 1692 it appears there were not only several animals with black ears, but some entirely black and one brown.*

* Storer, 'Wild White Cattle,' p. 154; and Harting, 'Extinct British Animals,' p. 234. Bewick, 'Quadrupeds,' 1824, p. 39, in a foot-note, says:—"About twenty years since there were a few at Chillingham with BLACK

It is believed that Culley's celebrated shorthorns at the beginning of this century were bred by a cross secretly obtained with a Chillingham wild bull.* During the last ten years Lord Tankerville has been trying the experiment of strengthening the domestic breed by crossing wild cattle and shorthorns. He commenced with a wild bull and two shorthorn cows. They produced a heifer and bull calf respectively on June 10th and 17th, 1877. Both the calves had red noses, though the male's was smutted with black; while the heifer (her dam's first calf) was the more correctly marked about the ears. The bull calf, being the first male of this new race, was named "Adam." In April, 1878, Adam's dam, a shorthorn cow, produced a bull calf by Adam. This bull when $3\frac{1}{2}$ years old measured 56 inches at the shoulder. In the following year Adam became the father of two more bull calves out of shorthorn cows. In 1877 a wild yearling heifer was shut off from the herd, and the following year a second one, in continuation of this experiment. The elder one dropped a calf by a shorthorn bull in 1880, but it died; its fertility was afterwards at least temporarily impaired by a remarkable contingency. but in October, 1881, both were supposed to be in calf to a shorthorn bull. None of these were to be added to the wild herd, nor were the wild cows to be ever readmitted.

LYME.—Mr. W. J. Legh, writing on June 3rd last, states that this "herd ceased to exist about four years ago." It will be of interest, therefore, to mention what state it was in ten years ago, since which time we have no particulars of it. The herd being on the decline so long ago as the year 1859, Mr. Legh purchased in October of that year the last surviving cow and calf from the Gisburne herd, and added them to his own at Lyme. The latest account of this herd appeared in 'The Zoologist' for 1878, and refers to a visit made by Mr. A. H. Cocks in June, 1877. Correcting one or two obvious errors by comparing this account with Mr. Storer's, taken in August, 1875, the following list includes the animals that were nearly, or quite, the last representatives of this ancient and interesting herd:—One old bull, said in 1877 to be dying of old age, and to be eleven or twelve years old, though

EARS, but the present park-keeper destroyed them, since which period there has not been one with black ears."

* Bewick, *op. cit.* p. 41 (foot-note), says:—"Tame cows, in season, are frequently turned out amongst the wild cattle at Chillingham."

referred to by Mr. Storer in 1875 as three years old; one bull, brought from Chartley as a yearling, in 1877 was probably rising or upwards of seven years; one cow, aged about ten; one cow, from the last named, by the old bull, died previous to August, 1875; one bull, out of the last-named cow probably, by the Chartley bull, sent to Chartley; one cow, *black*, out of the old cow first mentioned, by the Chartley bull was in 1877 rising or turned five probably; one heifer, about two years old, by the old bull, out of the old cow, both first mentioned; one heifer, about eighteen months old, out of the black cow, by the old bull; one heifer calf, by the Chartley bull, out of a domestic cow; one heifer calf, from Vaynol.

SOMERFORD.—In July last the herd consisted of thirty animals, made up as follows:—3 bulls, *viz.*, one born about April, 1885, one born about March, 1886, one born about June 21st last; 18 cows of all ages, the youngest being about two years old; 5 heifers, *viz.*, one about two years old, one born about February, 1886, one born about May, 1886, one born about June, 1886, one born about September, 1886; 4 heifer calves, *viz.*, one born January, two born about end of April or beginning of May, one born July 21st; total, 30. No steers are reared, all surplus bull calves are fed for veal. Three calves born this year have died, *viz.*, one male from quinsy, two females born prematurely. Two heifers were due to calve in September and four cows in October. This will make a total of fourteen births during the year, from which we may infer that this herd is in no danger of extinction from shy breeding. These cattle weigh up to fifteen score to the quarter when fed for beef. They are thoroughly domesticated, and allow one to move freely among them, and the second bull permitted two visitors and Mr. Hill (the agent) to handle him simultaneously. The cows are all regularly milked. The butter made from them is pronounced the best in the county, and they are as a rule excellent milkers. The highest record (*vide* Mr. J. Hill) is thirty-three quarts per diem, but the drain on this cow's constitution proved fatal in four months, notwithstanding that everything possible was done in the way of feeding.

These cattle are polled, and no exception is known to have occurred. They are black-pointed, but there is considerable range in the markings—far more than in any other herd. When Mr. Hill became agent, some nine years ago, he found the herd

somewhat uncared for, and many of the cows so aged as to be past breeding, and he has, therefore, during that interval of time, been keeping every good heifer calf, without weeding out too stringently on account of irregular markings. About 1876 or 1877 a young bull was exchanged with the Marchioness of Lothian for one from Blickling. This cross succeeded fairly well, a peculiarity in this strain being that many are born with the ears square-tipped, as if the animals had been marked by cropping. About the year 1879 a young bull was exchanged with Mr. A. Cator, of Woodbastwick. This bull was *brown-pointed*, but threw calves with red ears and muzzles, which were the first so marked known to have occurred at Somerford. Of the twenty-three cows and heifers, eleven have either very little black fleckings about the body or even none at all; while half a dozen have a good deal of black in thickly-grouped fleckings, spots, and small patches; two or three have probably fully one-third of the entire hide black. One cow, about ten years old, may be described as a blue-roan, black and white hairs being placed almost alternately over the greater portion of her body, which give her a *blue-grey* coloration. The fronts of her fore legs below the knees are black, and all the outside of her ears, instead of as usual from one-third to a half at the distal end. This cow was (according to Mr. Hill) giving twenty-four quarts of milk per day. One cow is red-pointed, and slightly flecked on the neck with the same colour. The black on the nose in the majority extends evenly round the whole muzzle, including the under jaw, but some have merely the naked part of the nose black, and in one or two even this is rusty coloured and not perfectly black. All, with the exception of the red-pointed cow, have a narrow rim of black round the eyes. The animals with the least black about them appear to have the finest bone and smallest heads. This may be following the old strain, while the others perhaps more nearly follow the cross-strains. The red-pointed cow and one of the pure white ones have small knobs or excrescences on either side of the frontal bone, like budding horns, but they do not protrude through the skin. The bulls (though both immature) are very strongly made, very broad across the thighs, short on the legs, and with remarkably broad, thick-set heads. Both are plentifully flecked with black, and in the younger of the two the fleckings extend to the lower part of his face, while the black on his muzzle is broader than in probably any other

example of park cattle. The cows produce their first calf when from two to two and a half years old. The bulls run with the herd throughout the year, but, in order in some degree to regulate the birth of calves, individual cows are temporarily shut up. One of the handsomest of the cows is almost entirely white, and is the daughter of a cow that died this year at the extraordinary age of twenty-three (at Chillingham they rarely reach ten) years. She was very dark, although of the old strain, and had withstood infection during the cattle plague epidemic. The old bull, aged eleven, was consigned to the butcher this spring, as he had become dangerous, having nearly killed the cattle-keeper.* In winter all the cattle, especially the bulls, develop long hair on the poll and neck, which divides along the central line and covers them like a mane. The hairs decrease in length backwards to the withers, where they cease somewhat abruptly. The bull calf and three of the heifer calves have very little black about them beyond their ears and muzzles, while the fourth is the blackest individual in this herd, having probably more black than white about it, in spots and patches with ill-defined boundaries. One of the cows and the younger bull have some black in their tail tassels, in all the rest it is quite white. The udders of the cows here are as large as those of ordinary domestic cows, which is not the case in the herds which are not milked. About 180 acres of the park are allotted to the cattle, consisting of excellent upland turf sloping down to the river Dane. It is said that the whole herd will sometimes gallop to a pond in their enclosure, and go in so deep that little but their heads remains visible. In dry seasons, when the river Dane has become unusually low, instances have occurred of cattle of both sexes crossing the river both ways; but calves produced by the park cows are kept if correctly marked, even when the sire was probably a common bull. The cattle are housed at night during winter, and supplied with hay.

CHARTLEY.—This herd in July last was made up as follows:—Bulls: 1, nine years old; 1, six; 1, four; 1, three; 1, one; 4 calves; in all, 9. Females: 6 cows, aged; 2 cows, four years old; 2, three; 2, two; 6 yearlings; 2 calves; in all, 20. Bullocks: 1, four years old; 1, three; 3, two; in all, 5. Total, 34. This

* This was no doubt the "big calf, eight or nine months old," seen by Mr. Storer on August 6th, 1875 ('Wild White Cattle,' pp. 258 and 259).

is the largest number recorded during recent years. An idea or tradition prevailed that the number could not be raised beyond 21, so the late Earl tried the experiment, and succeeded in April, 1851, in getting the number up to 48. The late Mr. E. P. Shirley, in November, 1873, recorded 27; the late Rev. John Storer, in July, 1874, found 25, and apparently an increase of two or three in the December following. In June, 1877, Mr. A. H. Cocks* found the number reduced to 20. Mr. J. R. B. Masefield,† whose visit was apparently about 1884, remarks that "a few years ago the number was reduced to 17"; but at the time of his visit the number was 28, and three had been recently killed. Mr. E. de Hamel,‡ in May, 1886, found 30. The existence of this herd, according to Sir Oswald Mosley (Hist. Tutbury, Co. Stafford, 1832), seems to be traceable further back even than that of Chillingham—namely, to 1248–49. The animals in this herd are heavier in front and lighter behind than any of the other herds; in general shape and character, both of bodies and horns, they closely resemble the old domestic breed of Staffordshire long-horns. The colour is uniform—white, with black noses, ears, and feet, sometimes ticked. Occasionally black calves are born, but are not kept. An old tradition says that the birth of a black calf means a death in the family of Ferrers. The number of calves reared annually would average about half the number of breeding cows. The udders of the cows are remarkably small, and incline forwards at an angle—very unlike the huge gland of a domestic cow. There is no evidence or knowledge of fresh blood having at any time been introduced. Lay cows were formerly admitted to the park, and crosses with the wild bulls obtained, but this was stopped twenty years ago. The result of these crosses was very good meat, but the cross-breeds were very awkward to milk or handle.§ The park is nearly 1000 acres, and is in its natural, original condition. It has never been manured, or

* 'Zoologist,' 1878, p. 276.

† Proc. North Staffordshire Nat. Field Club, 1885, p. 33.

‡ Handbook for the use of the British Association when visiting Birmingham, 1886.

§ A heifer calf born in 1875 from a domestic cow by a wild bull was said to resemble the wild animals very closely. Seen in the distance, the clear white, characteristic of the young of the park herds, was conspicuous.

broken up, or seeds sown, and contains a very great variety of wild plants. The cattle are fed on hay during winter in sheds.

VAYNOL.—In August last the herd here consisted of fifty-three animals—namely, 1 old bull, 2 young ditto, about 20 cows, and about 30 heifers and calves of both sexes. They are short-legged, straight-backed animals, all white with black muzzles, black tips to the ears, and more or less black about the hoofs, varying, however, in individuals, some being only faintly marked in this way. They all have horns, not very long, sharp, and turned up at the ends, but not quite uniform. In winter they are fed with hay, but are never housed, and none of the cows are ever milked. The beef is of excellent quality. The original importation of this herd from Kilmory took place in 1872, consisting of 22 head—namely, 1 bull, 9 cows, 6 heifers rising two years, 6 yearling steers. In May, 1882, the herd numbered 37 or 38, including eight young calves, and one bull, which would be killed when three years old. In August, 1886, the remainder of the Kilmory herd were brought here—namely, 2 yearling bulls, 14 cows and heifers, 8 two-year old heifers, 8 yearling heifers; 32 in all. The average number of calves born yearly (previous to the addition of the remainder of the Kilmory herd) was about 14, of which perhaps half a dozen were reared, the remainder being killed for veal. Some time within six or eight years of the first instalment of cattle coming to Vaynol a black bull calf was born. Very few deaths occur, and only among the calves, of which now and then one dies of “scouring.” The cattle, although never handled nor housed in winter, are not fierce, and will allow a near approach (except when they have calves) without showing any signs of impatience or alarm. Since the arrival of this herd at Vaynol in two instalments no fresh blood has been introduced, nor have any exchanges been effectual; nevertheless, Mr. Assheton-Smith is of opinion that the cattle have improved both in size and weight. Sir John Orde, in a letter dated June 1st, 1887, says that, shortly before he parted with the herd, he obtained two young bulls from Hamilton, with a view to changing the blood, but they proved useless, and both met with accidents, and had to be destroyed. His desire to introduce fresh blood was owing to an opinion that the cattle were deteriorating in bone and horn from close-breeding, and also slightly in fertility. The origin of the Kilmory herd, as gathered by Storer, is that the late Sir John

Orde in 1838 purchased a bull, the only survivor of the Duke of Buccleuch's (Dalkeith) section of the old Athol herd. This was used with Kyles (West Highland) cows, carefully selected. After some few years this bull and Lord Breadalbane's (Taymouth) were exchanged, and the latter was used with good results until 1852, when a West Highland bull calf was bought, and this sire was supposed to have much improved the stock. No further crosses were made up to the time Mr. Storer's book was published (1879); but since then the present Sir John Orde, in the letter above quoted, says that they had had at various times crosses with ordinary Highland, Ayrshire, and Indian cattle. The first named was the only one found desirable, the produce of some cows recently that proved infertile with the wild bull being very satisfactory in everything except colour. The cattle show traces of their Kyles extraction. About 200 acres of the park at Vaynol are allotted to the cattle, consisting of old (artificial) pasture, bordering a lake. In the same park are Red- and Fallow-deer, and in the plantations round the park there are a few Roe-deer descended from Scotch and German stock. A Roe doe was seen in August last with two fawns.

BLICKLING.—In July last this herd comprised :—Bulls: 1, five years old; 2, two years old; 1 calf. Cows: 9; 2 yearling heifers; 6 calves. Total, 21. Only the two young bulls and the two heifers were in the park; the others were kept up. Storer says that these cattle were introduced from Gunton about the beginning of the present century, and that they were nearly destroyed a few years since by the rinderpest, which killed off all but three or four; since then the herd has been somewhat made up, and consequently somewhat altered its characteristics. The cattle here are black-pointed, but the six heifer calves born this year are irregular in their markings. Two have black ears, but no spots; while one has red ears, and the other has white ears. These cattle, it is said, sometimes have red points; sometimes there is no colour about them at all. They are frequently spotted like flea-bitten Arab horses. All calves with black points are preserved, amounting to about five or six in a year. The herd is low at present—only numbering about twenty altogether, ranging from five years old to calves of this year. There have been a large proportion of bull calves during the last year or two. The individual animals are finer at the present

time than when Mr. Storer made his report, but they are not so large as they were previous to the rinderpest, which destroyed the whole herd except a few calves. By the advice of Mr. Storer a cross was obtained from Somerford, two young bulls being sent thence, one of which had an incipient horn. There was another cross about five years ago with a cow from Yorkshire, which in appearance was like the cows in the Blickling herd—it was out of a white shorthorn by a black Galloway. No horns have appeared among its descendants, though one cow always throws black calves (which are never reared), and in some of the others the black points have been more than usually pronounced. As soon as the animals are adult, and are taken into the dairy herd, they no longer range in the park, but are fed in meadows. The land is light, and they are given cotton cake all through the summer; in winter this is supplemented by hay, but no roots are given. They are housed at night in cold weather.

WOODBASTWICK.—The herd here in August last contained:—1 bull; 12 cows, aged from nine to two years; and about the same number of young animals. Ten calves have been born this year, of which three have died. There is also a white shorthorn bull, which was used for breeding purposes last year. Originally all these cattle had red ears and red muzzles. Latterly, however, for want of fresh blood, it has been impossible to maintain the red points. A red-pointed bull, received in exchange from Somerford (about 1879), proved useless. Mr. Cator was therefore obliged to use a black and white bull sent from Somerford, which had (as was supposed) some black Angus blood in him. The stock by this strain have nearly all had black points, though some few have them of a dark chocolate colour, and a few others are red-pointed. This bull had a good deal of black on his back, and the calves at first took after him, being in most cases more or less spotted with black. As he got older, however, the calves took after the cows, and in 1883, which was the last year he was used, all the calves came pure white, with black ears and noses. The next bull used was a son of the last, and the result was satisfactory as regards markings, although more calves were black than red-pointed. The present bull is a son of this one, and is a splendid animal and beautifully marked. Though a little light behind, as all this breed seem to be, they are very heavy in the withers. At different times some three or four

different shorthorn bulls have been used, the last occasion being last year (1886). This was done with a view to improving the hindquarters, which are rather light. They are inclined to be weak in the loins, and their coats had been getting very fine. This last cross has not proved very successful as regards marking, all the calves turning out pure white, ears and all, and a few will have horns, while the character of the head differs from the old type, which was short, and broad between the eyes. The cattle, from interbreeding, had become delicate, and thin in the coat, but the shorthorn cross has much improved the coat. The white of the shorthorn looks yellow by the side of the pure white of the park breed. Though the cattle are not considered hardy they are good milkers when well-fed. This herd originated from Gunton stock. According to Storer the late Mr. A. Cator bought one cow at a sale about 1840; his son, the present proprietor, says in a letter, "about the year 1832." This cow produced a bull-calf, and at various times subsequently the herd was recruited by red-pointed calves from Blickling. The cattle here are kept in fields, and do not enjoy the wider range of a park. The soil is poor and gravelly. They are stalled all the winter and fed on turnips. In the exceptionally protracted bad weather of last winter they were given oil-cake in addition.

In conclusion, the Committee request that the thanks of the British Association be conveyed to the following noblemen and gentlemen for the assistance they have kindly rendered in the preparation of this Report, and that a copy of this Report may be forwarded to each of them:—The Dowager Marchioness of Lothian, Blickling Hall, Norwich. The Earl Ferrers, Chartley Castle, near Stafford. The Earl of Tankerville, Chillingham Castle, Belford, Northumberland. Sir John W. P. Campbell-Orde, Bart., Kilmory, Loch-Gilp-Head, N.B. Sir Charles W. Shakerley, Bart., C.B., Somerford Park, Congleton, Cheshire; and his Agent, J. Hill, Esq., Smethwick Hall, Congleton. G. W. Duff-Assheton-Smith, Esq., Vaynol Park, Bangor, North Wales. A. Cator, Esq., Woodbastwick Hall, near Norwich; and his son John Cator, Esq., Woodbastwick Hall, near Norwich. D. C. Barr, Esq., Chamberlain to his Grace the Duke of Hamilton, Hamilton, Lanarkshire.

ORNITHOLOGICAL NOTES FROM NORFOLK AND SUFFOLK.

By T. E. GUNN, F.L.S.

THE following notes comprise the more remarkable ornithological events which came under my observation in these two counties during the year 1886.

An adult female Montagu's Harrier was killed in the neighbourhood of Gaywood, near King's Lynn, and forwarded to me on August 16th. On Dec. 17th a young Peregrine Falcon was shot on the Woodhall estate, near Downham Market. The stomach contained remains of a Partridge. I failed to detect any traces of entozoa, which have occasionally been met with in this species. (See 'Zoologist,' 1880, p. 515; and 1881, p. 306.)

On June 29th I received an adult female Long-eared Owl, and on July 3rd and 5th two fully fledged young ones that, having moulted their wing-feathers, were able to fly. The stomachs contained remains of field mice. The colour of the irides in both old and young birds, noted whilst the birds were alive, was bright orange.

An adult female Barn Owl with the breast of a deep buff colour was shot Oct. 29th near Harford Bridges, Old Lakenham, and sent to me. I have on several previous occasions received examples of this variety, and generally at the period of the autumn migration. The chief marks of distinction in the sexes are the spotted flank feathers of the female, those of the male being quite plain. The plumage of the under parts, which in the ordinary Barn Owl is white, is in this variety a deep buff, while the back and upper parts are several shades darker than usual. The stomach of the specimen noted contained the remains of a common brown rat.

In my former notes (Zool. 1886, p. 472) I reported my success in breeding and rearing the Little Owl. Last year I was not quite so fortunate. The old and young birds passed successfully through the autumn moult, when it became almost impossible to distinguish them, so nearly alike were they in plumage. They agreed pretty well until January, when their usual pugnacious disposition again manifested itself to such an extent, that I was compelled to remove the young ones to another cage. The old birds, however, appeared to get on no better by themselves, but

fought so furiously at times that I was afraid they would tear each other to pieces, and I had on several occasions to separate them. Eventually they settled down more quietly, and the female, taking to the nest, laid four eggs, which she sat upon for the usual time, but failed to hatch. Meanwhile, in another cage, two of the three young birds had mated, and, after attempting to get rid of the third by driving and hunting it about the cage, they eventually killed and devoured it. Although the usual complement of eggs was laid, they were not hatched; but, as the two pairs of birds seem now to be more comfortably settled, I anticipate better results next breeding season.

An adult male Little Owl was shot Nov. 6th, and sent to me from the neighbourhood of Harleston. Its stomach contained the remains of a tumbler dung-beetle, a centipede, five or six lepidopterous larvæ (including that of the common sword-grass moth), and a small black beetle, unidentified. This specimen exhibited no traces of confinement; its internal organs were healthy, and its plumage quite perfect. On comparison with my tame specimens it proved to be much less in weight, being $6\frac{1}{2}$ ozs. instead of $7\frac{3}{4}$ to 10 ozs. The plumage of the wild bird also was somewhat darker, the beak of a deeper yellow, the claws finer, sharper, and more deeply curved; the following being its dimensions:—Total length (beak and tail included), $9\frac{1}{4}$ in.; expanse of wings, $22\frac{1}{4}$ in.; wing, from carpal joint, $6\frac{1}{4}$ in.; cere and bill (ridge of upper mandible), 1 in.; tail, $3\frac{1}{4}$ in.; tibia, $2\frac{1}{2}$ in.; tarsus, $1\frac{5}{8}$ in.; middle toe and claw, $1\frac{1}{2}$ in.; outer toe and claw, 1 in.; inner toe and claw, $1\frac{1}{4}$ in.; hinder toe and claw, $\frac{7}{8}$ in.; weight, $6\frac{1}{2}$ ozs. avoirdupois.

On Sept. 13th an immature male Nightjar was shot at Beeston, near Norwich. The spots on the outer primaries, which are generally white in the adult bird, were in this specimen of a pale brown, as in the female, excepting that on the first primary, which had just commenced to show a white centre. The stomach contained remains of insects, principally small beetles.

As usual at this period of the year, a small flock of Gray Wagtails made their appearance on Oct. 2nd at the dam at the back of the New Mills, Norwich. I noticed one, a particularly rich-coloured male bird. A few days after their appearance they were scattered along the banks of that part of the river (Wensum) between the New and Hellesdon Mills.

The Lesser Spotted Woodpecker, at one time regarded as rare in Norfolk, is now added to my list yearly. A female specimen was shot Jan. 26th at Runtor, near Cromer, its stomach being filled with insect remains. A second, also a female, had been previously killed on the 22nd near this city. A third was caught by a cat, Oct. 7th, in the parish of Cossey, and brought into the house alive, but died the following day.

On June 25th I found a nest of Greater Spotted Woodpeckers in the decaying trunk of an old birch tree, the hole being situated about twelve feet from the ground. The old birds had made several previous borings above the spot finally selected, the wood apparently being too much decayed to answer their purpose. My attention was first directed to the nest by the clamorous cries of the young birds, five in number. Of these the two smallest and latest hatched proved to be males; the three others larger and older, as indicated by the fuller development of their feathers, were females. I have before remarked this disproportion in the size of the sexes, in the young of the Sparrowhawk (Zool. 1885, p. 51). The stomachs of the young Woodpeckers were filled with larva-skins, spiders, and small beetles. The decayed tree was felled, and I cut out that section of the trunk which contained the nest. A number of broad spreading fungi were attached to the trunk, which the old birds apparently used as shelters in their borings, a particularly fine one being situated just above their abode, and on which I occasionally saw the old birds sitting. The stomach of an adult male of *Picus major*, received on Nov. 30th, contained three full-grown larva-skins of the wood-leopard moth, together with other insect remains.

An immature male Missel Thrush, procured on July 5th, had in the stomach remains of small beetles and larva-skins, and three *Filaria*, each about an inch long.

The first specimen of the Ring Ouzel seen during the autumn migration was a male, shot Sept. 30th at Rockland, near Norwich.

On dissecting an adult female Kingfisher I found the stomach contained a roach which measured $2\frac{3}{4}$ in. in length, and which, being longer than the bird's body, was nipped across the middle, and lay doubled in the stomach.

Mr. Gurney (Zool. 1886, p. 391) mentions the fact of Bramblings, *Fringilla montifringilla*, being more numerous during the winter of 1885—86 than had been the case for some years:

I can fully confirm this statement. One field of sainfoin near Norwich, in February, 1886, was occupied by immense flocks of Bramblings. A gamekeeper, taking advantage of their numbers, cleared the snow from a patch into which they crowded to feed, and, firing both barrels of his gun into the flock, picked up about six score. I regret to add that I did not hear of this until several days afterwards, when it was too late to examine them, as they had been eaten by his ferrets.

On Oct. 21st a fine young Goshawk, *Astur palumbarius*, was shot near Yarmouth.

In the Editor's footnote to a communication headed "Swallow perching on an angler's rod" (Zool. 1886, p. 417) an instance is mentioned of a White Owl perching on a gun while held in a sportsman's hand. A somewhat similar instance occurred to myself when collecting small birds a few years since; I was lying in ambush with my walking-stick gun protruding, when a Wren suddenly perched on the barrel, and remained there some few seconds before taking flight.

In reference to Mr. Kelly's communication (Zool. 1886, p. 368) on the subject of three Cuckoo's eggs in one nest, I may refer to a similar circumstance that occurred to my knowledge in this neighbourhood, and which I recorded at the time in 'The Zoologist' (1865, p. 9618). In my case, however, there were two young Cuckoos and one addled egg, in addition to two young Meadow Pipits. The young Cuckoos being hatched, it was impossible to say if all belonged to one parent, as might possibly be determined in the case of the eggs, if it be true that the same hen Cuckoo always lays similarly-coloured eggs.*

Two immature male Blackbirds were shot on Sept. 16th, the first having the two outer feathers of one side of the tail white; the second having the breast, back, tail, and upper tail-coverts of a slate-colour; wings pale greyish brown; head, neck, and throat pale ash-brown, spotted with darker brown, as is usual in immature birds; feet and legs pale brown. On Dec. 4th an adult female Blackbird, killed at Tivetshall, had its stomach filled with

* Let me here express my regret that the proposed "General Index" to 'The Zoologist' still remains unpublished; it would prove an invaluable boon to working naturalists, and especially to the contributors to this Journal.

remains of the guelder-rose berries, several stones of whitethorn berries, the empty skin of a lepidopterous larva two inches in length, a millepede, and two blackberries. The plumage of this bird was beautifully variegated with white feathers all over its surface. An adult male in similar variegated plumage was killed on the 3rd of the same month near Ipswich, and sent to me for preservation. The food of this was guelder-rose berries, small snails, and beetles.

A curious chocolate-coloured variety of the Rook (a female bird) was shot at Old Buckenham on Sept. 17th; the head, back, rump, upper wing-coverts, and under parts of its plumage of a deep chocolate-colour; the wings and tail brown, the feathers being edged with brownish grey on the outer margins; its bill, irides, legs, toes, and claws partake of the general coloration by being of a dark chocolate.

An adult male Green Woodpecker, shot near Norwich in January, had the secondary feathers and coverts of the left wing of a pale brown colour. Variation in the plumage of this species, I believe, seldom occurs. Another specimen, also an adult male, was sent me by Mr. G. Whincop from Horsford, Sept. 6th. It had only eight tail-feathers, the centre ones being curiously aborted, the shafts curled up, and with only a few fibres in lieu of well-developed webs.

As the Quail is apparently not of so frequent occurrence as formerly, I may mention the only example I saw last year, namely, a hen-bird, which was shot at Old Buckenham on Oct. 17th. The ovary contained small eggs, and the stomach seeds and grit.

A dark variety of the Wigeon, an immature male, was shot on Strumpshaw Broad on Oct. 21st. It had apparently but just arrived, and was very tame. It would not be flushed by a dog, but merely swam out of his reach. The stomach was filled with grass and grit.

An adult female Smew was shot in February on Rockland Broad. The stomach contained remains of fish only. This marine species seldom wanders so far inland except during severe weather. I have one that was killed on the River Wensum above Norwich in cold weather a few years since.

An adult male Pochard, shot at Colney, near Norwich, early in February, had the irides of a brilliant carmine.

Mr. W. D. Ward, of King's Lynn, informs me he killed, with his punt-gun, on Sept. 18th, two out of three Avocets in that locality, and gave them to his friend Mr. Thompson, who has had them preserved.

Mr. Ward also shot a male Spotted Redshank on Sept. 13th, an adult bird, retaining traces of its summer plumage. The base of lower mandible was deep red, as also were the legs and feet, the same parts in spring and summer being of a deep claret-colour.

Mr. J. H. Gurney, jun., sent me for preservation a white variety of the Ringed Plover that he had shot at Cley on Sept. 1st, an immature specimen, and a female by dissection. Irides pale brown; legs pale straw-colour; the entire surface of the dorsal plumage creamy white, with a crescent on each side of the neck of a pale ashy brown; as also are the outer edges of the primaries and the centres of the middle tail-feathers. I remounted a similar variety, obtained in Norfolk four years ago, for Mr. H. M. Upcher, of Feltwell.

Early in February an adult male Bittern was shot by Mr. R. Johnson in the neighbourhood of Tunstead; it weighed 2 lbs. $2\frac{1}{4}$ ozs. On Dec. 1st a female specimen was killed at Benacre, near Wangford, by a gamekeeper. The ovary contained minute eggs, and in the stomach were remains of a sharp-nosed eel, fragments of the elytra of a beetle, and bits of weed, as well as stems of reeds and several shrimps.

Two examples of the Egyptian Goose were killed on the marshes of Barford on Dec. 17th, one being a fine old male.

An adult male Goosander was shot by the Rev. J. R. Lane on the River Wensum, at Tatterford, on Feb. 10th. It was in splendid plumage, with a rich salmon-coloured breast; iris deep red. Both the gullet and stomach contained the remains of roach, and a quantity of minute pebbles. On Feb. 25th, on the Bure, at Wroxham, I caught sight of a male Goosander about 100 yards off in one of the smaller broads, and two days later I received two adult males that were killed on the upper lake at Gunton. Lord Kimberley informed me that he had noticed several Goosanders on his lake at Kimberley in Dec., 1886, and Jan., 1887. The majority appeared to be old birds, several of them males, which are easily distinguished, even at a considerable distance, by their conspicuous plumage. The Rev. H. H.

Lubbock wrote word that he saw seven of these birds flying over the Guntun lakes on Feb. 7th.

An adult female Red-throated Diver was killed on Oct. 20th at Westleton, near Saxmundham, in the gullet of which I found three small flounders fresh and entire. The stomach contained fish-bones and small pebbles.

An immature Common Tern was found (Oct. 17th) entangled in some reeds on Surlingham Broad by two men who were pike-fishing. The bird was still alive when found, but so much exhausted with struggling to release itself that it died soon afterwards. A few years since, I remember, a Kingfisher was entangled in a similar manner in Kendal Dyke, Hickling Broad, but in that instance the prisoner was more fortunate, and flew away on being released.

On Oct. 1st I saw a large flock of Common Gulls hovering over the new railway station at Thorpe. The weather was cold and stormy, and an easterly wind had probably driven them thus far inland. Two birds of this species were brought to me alive a day or two afterwards in an exhausted condition. One of these is still alive in a friend's aviary, subsisting on fish, flesh, and grain, and on seemingly good terms with a couple of Moorhens. The stomach of a Common Gull which I dissected on Nov. 30th contained fish-bones and scales, the seeds of two species of rush, and the legs of a beetle.

An adult female Cormorant was shot on April 12th on Hickling Broad while perched on one of the stakes that mark the course of the river channel. This species is now only an occasional visitor to this part of the east coast, although in former times, according to Sir Thomas Browne, it used to breed upon trees at Reedham; and the Rev. R. Lubbock, in his 'Fauna of Norfolk' (p. 173), notes that "Cormorants have in some seasons nested in the trees around Fritton decoy in some number; in other years there has not been one nest."

ON THE GOLDENEYES AND PTARMIGAN OF ICELAND.

BY THE REV. H. H. SLATER, B.A., F.Z.S.

AFTER having hazarded an opinion which is contrary to general experience, it is always satisfactory when subsequent evidence arises to support it. I recently recorded in 'The Ibis' (1886, p. 49) my belief that the Common Goldeneye, *Clangula clangion*, Linn., occurs in Iceland. I had only the evidence of my field-glass to go upon, and however well satisfied with such an observer may be in his own mind, he prefers to have conclusive evidence to lay before others.

I am glad, therefore, to be able to mention that in a box of skins lately received from a trustworthy correspondent in the north of Iceland, there were two examples of *C. clangion*. One of these is fully adult, with green-glossed head; the other a young bird in its first distinctively male dress, with sooty unglossed head. They were killed in the winter of 1885 in the Eyja- or Oefjörd.

Clangula islandica was first distinguished from *C. clangion* by Latham, and definitely named by Gmelin in 1788. Faber, the Linnæus of Iceland, as Prof. Newton points out (Baring-Gould, 'Iceland, its Scenes and Sagas,' Appendix, p. 416), seems not to have been aware that the two species had been determined to be distinct, and his remarks on *Clangula* refer presumably to *C. islandica*.

There has been no record of the occurrence of *C. clangion* in Iceland since Faber's time. Herr Preyer, indeed ('Reise nach Island,' &c., p. 411), goes so far as to remark that "*Anas clangula*, L., kommt in Island durchans nicht, vor und wird durch *Fuligula barrovi* ersetzt." Nor does Prof. Newton (*l. c.*) hint at its occurrence. Henceforward it will have a title to be represented in the catalogue of the birds of Iceland. I think it must be a scarce visitor, seldom seen far from the sea. It was near the Skaga fjörd that I saw it; when at Myvator, where ducks most do congregate, I made a careful sketch of the heads of the two Goldeneyes, and submitted it to the various egg-farmers there, who have indubitably a fair knowledge of the birds they cultivate (there is no exaggeration in this word, though the birds in question are strictly wild), and their testimony was

unhesitating and unanimous, that they were quite familiar with the one (*islandica*), but the other they had never seen there.

It is sometimes asked, "What is a Grouse, and what is a Ptarmigan?" I should be inclined to divide the genus *Lagopus* roughly into two groups, in order to answer that question:—first, the Grouse, which "beck," as our Red Grouse and the Willow Grouse do; secondly, the Ptarmigan, which grunt or croak. This difference, which is striking enough to one acquainted with the various species out of doors, is not the only one; the Grouse, as before mentioned, have the fifth primary longer than the second; the Ptarmigan, as above, have the fifth shorter—at least this is the case in *L. mutus*, the Common Ptarmigan, and *L. rupestris*, the Rock Ptarmigan; whether it holds good in *L. hemileucurus* of Spitzbergen, and *L. leucurus*, Sw., of N.W. America, I am unable to say, but should be glad to learn as to the *Lagopus* collected in the Kurile Islands; examination of my only specimen (in winter dress) shows that the second and fifth primaries are equal in length, but this may only mean that its wing-quills were in this case not fully developed.

Although it is possible to separate *L. albus*, the Willow Grouse, in winter dress from *L. mutus* or *L. rupestris*, by examination of the primaries, I cannot find any constant character by which to separate the two latter, though they are distinct enough in summer or autumn plumage. But whilst examining my series of *L. rupestris* in winter dress, I hit upon a somewhat interesting peculiarity, which I do not remember seeing mentioned anywhere. Of my twenty-two winter examples, twenty are males, and I was struck with the manner in which the black lore varies in different birds. Some have merely a small black spot immediately in front of the eye, and another at the base of the upper mandible, with one-fifth of an inch of plain white intervening between them; these I take to be young birds. Others have a broad loreal band reaching from in front of the nostrils, over the eye, into the auriculars, and also a small stripe of black feathers on the lower mandible. I am inclined to believe that the extent of the black loreal patch depends upon, and increases with, the age. I found a few odd feathers of the autumn plumage still remaining on the neck and back; about half of these, in the supposed younger birds, are ordinary male feathers, and the rest are feathers like those of the female—in other words, the remains

of the first plumage, which in both sexes resembles that of the old female. Any coloured feathers remaining upon those which I take to be the old birds are ordinary male feathers. Moreover, the development of the comb, or wattle over the eye, corresponds with that of the black lore. In the old males there is a full red wattle, with fringed and projecting upper edge; in what I consider the adolescent males, who have only the promise of a black lore, the comb is insignificant, and yellowish in colour, like that of the hen bird.

Will any reader of 'The Zoologist,' who may happen to have a series of skins of any other Ptarmigan, be good enough to look over those in winter plumage, and state whether he finds a similar state of things to exist?

NOTES AND QUERIES.

MAMMALIA.

Parasitic Disease in the Hare.—At a recent meeting of the Paris Biological Society, M. Mégnin gave an account of a peculiar disease which is very prevalent at present among Hares in Alsace. It is a parasitic disease, a sort of pulmonary tuberculosis, caused by the presence, in the lungs, of *Strongylus commutatus* (*Filaria pulmonalis* of Frölich). The same disease was noticed in Thuringia in 1864.

Squirrels at a distance from Trees.—In the month of September last, when Grouse-shooting in Elginshire, I was surprised one day to come suddenly upon a Squirrel in the heather, right out on the open moor, far away from any trees. The little animal was proceeding by short bounds through the heather, every now and then stopping to rest, as if much fatigued, and was apparently on migration. A similar case has been noticed by the late A. E. Knox in one of his delightful books, 'Autumn on the Spey' (p. 52); and other instances are mentioned by Mr. Harvie Brown, in his excellent essay on the Squirrel, Proc. Roy. Phys. Soc. Edinb., vol. vi. (1881), p. 166.—J. E. HARTING.

Young of the Hedgehog.—On the 17th October last I was shown a Hedgehog which had been found in an outhouse, with a litter of seven young ones, as near as I could guess about a month old. Bell, in the second edition of his 'British Quadrupeds' (p. 110), says, "The female produces from two to four young ones early in summer"; and Macgillivray (Jardine's Nat. Lib.) states that "Early in the summer the young are

produced; they are generally three to four, and are born blind." It would be interesting to know whether this was the second litter this year. I suppose Hedgehogs are capable of producing two litters in a year, as I have not heard or read to the contrary.—F. HAYWARD PARROTT (Walton House, Aylesbury).

Distribution of the Bank Vole.—I see by your paper in 'The Zoologist' for October, that you wish for localities for the Bank Vole. I accordingly send you a list of the counties in which I have taken this little animal. At Kingsbury, Middlesex, it was quite common twenty years ago; I sent some from there to the late Mr. Yarrell. The first specimen I ever saw was brought to me by a favourite cat; I have it still, and it is the best specimen I think I ever saw. I have taken the Bank Vole in Buckinghamshire, Berkshire, Hants (Isle of Wight), Hertfordshire, Cambridgeshire, Herefordshire; and I once found a dead one within a quarter of a mile of Monmouth. About twenty years ago I saw a very pretty variety, of a light cream-colour with red eyes, that was taken in Huntingdonshire. I believe it will be found to be regularly distributed in England, if looked for.—FREDERICK BOND (Staines).

Black Rat in Wexford.—The Black Rat is not infrequent in the neighbourhood of New Ross. I have myself met with it at Kilmanock, where it can hardly be called very rare. I have also heard of it at Duncannon, a village near Arthurstown, not far from Hook.—GERALD E. H. BARRETT-HAMILTON (Harrow School, Middlesex).

The Musk Rat and the Unio.—There has been much discussion in regard to the method by which the Musk Rat, *Fiber zibethicus*, Cuv., opens the *Unios* which it uses for food, and many methods have been suggested as to the manner in which the body is taken from the shell. Nearly every method proposed has been based upon the strength of the adductor muscles and the supposed impossibility of overcoming their power without killing, or at least poisoning the animal. In experimenting with some *Unios* last summer, I found that it was an easy matter to get the shell open as far as the ligament would open it, and that in this condition it required much less than a Musk Rat's strength to force it entirely open. When the *Unio* is travelling along, its foot projects a half inch or more from the lower side of the shell. If, while the foot is in this, its usual condition, the two valves be pinched, the foot will be caught between the closing shells; if the pinching be continued for half or three-quarters of a minute, the animal, probably from the pain produced, becomes paralyzed and unable to make use of the adductor muscles. Now, if the shell be released, it will fly open about one-half inch, and can easily be torn entirely open. The strength needed to keep the foot from being drawn into the shell is not great, being far less than that of the jaws of the Musk Rat. So all that it is necessary for

Fiber to do when he wants his dinner is to swim along until he sees a *Unio* at the bottom, dive, and quickly seize the animal, then swim leisurely to his hole or the bank. By the time he has reached a good place for eating his meal the *Unio* will be ready to open far enough for the insertion of paw or nose, and the luscious bivalve can be devoured from the whole shell. In my own experiments I was usually, though not always, successful. The failures I think were always due to the fact that not quite enough of the foot was caught by the closing shell; this was caused by my disturbing the animal before taking hold of it. If the Musk Rat be not more supple than I, he must occasionally miss his meal.—*Prof. Austin C. Apgar, Journ. Trenton Nat. Hist. Soc.* 1887, p. 58.

Bats preyed upon by Owls.—There is nothing new in the fact that Bats are sometimes preyed upon by Owls, as also by the Hobby, *Falco subbuteo* (Zool. 1877, p. 472), for this has been ascertained by examination of the pellets ejected by these birds, or by discovery of the remains of Bats in their stomachs. But it does not often happen that one is enabled to see *how* the Bat is captured by the Owl, and we may reasonably suppose that, as a rule, he is snatched from the wall, or roof, of the church, barn, or old building in which both species have been in the habit of roosting. The rapid eccentric flight of a Bat would in nine cases out of ten probably prove too much for the steady-going “mousing Owl.” But that an Owl will occasionally venture a flight at a Bat is vouched for by an observer at Greenlaw, where, in the High Street, one evening in August last, an aerial contest of this kind was witnessed. We are indebted to Mr. L. Richardson for the following account of what took place:—“A number of persons standing in the High Street about half-past eight o’clock on Thursday evening (Aug. 18th) saw a Bat, followed by an Owl in hot pursuit, fly over the houses on the south side of the street. The pursuit was continued down the street for a short distance, the Bat being only about a foot in advance of its pursuer, which, strangely, kept at this distance, without apparently making any effort at a nearer approach, and at the same time keeping a like average distance below the flying line of the Bat, which in its wavering was continually changing its altitude. By this strategy the Owl was ready to strike on the first favourable opportunity presented by the Bat coming downwards. This opportunity was not long in coming. The Bat crossed the street into the Green, where it made a sudden dart downwards. The Owl at once got under, forcing the Bat up again, and causing it to continue its forward course a little further. The Bat soon made another descent, and when on a level with the Owl the latter instantly struck it with one of its wings, either stunning or killing it, and when it was falling it was secured by the Owl, and borne away in triumph to the neighbouring church-tower.” From the infrequency with which the skulls or other remains of Bats have been found in Owls’ “pellets,” we may infer

that they are probably only captured when the Owl is "hard up" for more palatable and more easily captured prey.

BIRDS.

Breeding of the Tufted Duck in Aberdeenshire.—On the 11th of August last I was in a boat on Loch Skene, near Aberdeen, for the purpose of looking for the Tufted Duck, *Fuligula cristata*, which I had been told had bred there for the last three years. I heard also that, shortly before I was there, a female Tufted Duck, with a brood of young in down, was seen to cross a road not very far from the lake, and that one of the young ones was caught, the mother having flown off into some standing corn close by. I have little doubt that when disturbed she was leading her young from the breeding-place to the lake for the first time. She called her young to her into the corn. When we were on the lake we saw, first, several parties of Teal and Mallard, both of which breed there. We afterwards saw a Tufted Duck rise from the water, and from her manner as she went off, flying as if wounded for about a hundred yards, and then returning to the same spot and again acting in the same manner, I have little doubt but that her young were on the water, but owing to its being very rough we could not detect them. On another part of the lake we afterwards saw another Tufted Duck acting in a similar manner, and I came to the same conclusion, but we failed to get sight of the young. I learned from the keeper that there were this year five or six broods of young Tufted Ducks on the lake, and I have since heard that he saw the first brood on the lake two years ago, and that, now his attention was called to it, he had known the call-note for several years. Besides the two which I suppose had young I counted a flock of about twenty-five Tufted Ducks flying high in the air, and several smaller parties which did not leave the lake.—WILLIAM BORRER (Cowfold, Sussex).

[In connection with this subject, on which we have lately received two or three communications, attention may be directed to a short paper by Mr. R. Jex Long, printed in the 'Proceedings of the Natural History Society of Glasgow' for 1880 (vol. iv., p. 53), entitled "Notes on the occurrence of the Tufted Duck, *Fuligula cristata*, as a breeding species in Scotland."—ED.]

Food of the Mistletoe Thrush.—I shall be obliged to any of your readers who will tell me if they have ever observed the Mistletoe Thrush, *Turdus viscivorus*, or any other bird, to feed upon the berries of the mistletoe. Although called *ἰξοβόρος* by Aristotle, and *viscivorus* by later authorities, it seems doubtful whether either name is especially appropriate. In this part of Shropshire the mistletoe is not common, but I have frequently noticed that the berries on the few plants we have are left to decay even after severe winters, when those of hawthorn and holly have all been eaten. Perhaps

some of your correspondents who live where mistletoe abounds will give me their opinion.—WILLIAM E. BECKWITH (Eaton Constantine, Salop).

Swifts laying in Martins' Nests.—In 'The Zoologist' for September (p. 348) I see Mr. F. Bond writes about Swifts nesting in Martins' nests. About ten years ago I found two or three pairs of Swifts building, or rather laying, in Martins' nests outside a barn in Lincolnshire. I saw the Swifts going in and out of the Martins' nests, and, getting up to the latter with a ladder, I found Swifts' eggs in the nests, some of which I have still in my collection.—G. E. LODGE (5. Verulam Buildings, Gray's Inn).

Late stay of the Swift in Ireland.—On October 4th, near Cappagh, Co. Waterford, while watching the movements of a large flight of Swallows, in company with my friend Mr. R. J. Ussher, we were astonished to see among them a Swift, which came flying close over our heads in full view, and was clearly identified by both of us. Is not this an exceptionally late stay for this bird, at least in Ireland? At Shillelagh the Swifts have never remained later than August 16th, and they generally depart at least a week earlier, though this year I saw a solitary one flying about Shillelagh church on August 27th. The flock of Swallows among which we saw the Swift was a very large one, numbering some hundreds, most of them *Hirundo rustica*, but with a few House Martins amongst them, many settling from time to time on the tree tops, and then flying off again. They had evidently halted for a short time to rest and feed before finally leaving the country. Later in the afternoon we noticed large numbers of Swallows flying towards the south-east, in the direction of the sea. I observed several House Martins near Shillelagh on October 11th. Mr. Ussher wrote to me that there was again a large number of Swallows at Cappagh on the same day. The Chiffchaff was still at Shillelagh on October 6th.—ALLAN ELLISON (Shillelagh, Co. Wicklow).

Knot on the West Coast of Scotland.—The Knot, *Tringa canutus*, is generally considered a scarce bird on the west coast of Scotland, and the late Mr. Robert Gray was of this opinion; yet ever since the middle of September there have been several hundreds of birds of this species on the shores of Loch Gilp. To what extent does the species really occur on this coast?—ARTHUR H. MACPHERSON (Bishopton, Lochgilphead, N. B.).

Lesser Redpoll nesting in Middlesex.—On Sept. 14th I found two young Lesser Redpolls, *Linota rufescens*, at Highgate, dead, but quite fresh. This is interesting, not only as affording evidence of the Lesser Redpoll nesting in Middlesex, but on account of the late date for the nestlings, which is unusual. In the 'Birds of Cumberland,' where a full account is given of the nesting habits of this bird (p. 47), the authors say, "The first eggs are usually laid early in May, but we have found fresh eggs in July. In a letter to me upon the subject, one of the authors, the Rev. H. A. Macpherson, writes, "The date is very unusual. I have known Goldfinches to have

young in the nest at the end of this month (September), but I never heard of Redpolls nesting after July. In Switzerland all birds breed late on the high stations, but your date for the *Linota* is very remarkable." I may add that I have seen Lesser Redpolls at Highgate every year throughout the summer, and they probably breed here regularly. In 1884 a pair built a nest among the upper twigs of an arbutus tree, from which I obtained four eggs.—JOSEPH VINE (11, Chester Road, South Highgate).

Late nesting of the Greenfinch.—On the 16th September I took a nest of three young Greenfinches, apparently about five days old, out of a plum tree in an orchard near Sittingbourne, Kent. One of the birds was delicate, and died on the 29th; the other two (a pair) are vigorous at the present time (October 1st). As the parents must have been in moult when the nest was discovered, it is highly improbable that they would have continued to feed the young until able to shift for themselves.—A. G. BUTLER (Natural History Museum).

Missel Thrush feeding on *Pieris rapæ*.—While staying at Windermere, during the first week in August, I was astonished to see a Missel Thrush capture three specimens of *Pieris rapæ* on the wing in succession and devour them.—W. HARCOURT BATH (Ladywood, Birmingham).

Nidification of the Noddy and Sooty Terns in the West Indies.—From a long letter lately received from a friend at Kingstown, Jamaica, I gather the following facts, which I think may be of interest to ornithologists, especially as so much doubt remains as to the number of eggs these birds lay. The egg of the Noddy (*Anous stolidus*) is more chalky than that of the Sooty Tern (*Sterna fuliginosa*) and is also distinguished, after boiling, by the peculiar consistency of the albuminous portion, which, instead of turning white, has an opalescent appearance that my friend "can only compare in colour to that of soapy water." The Noddy rarely, if ever, nests on the sand, but heaps up a mass of sea-weed on the low bushes or clumps of prickly-pear growing on the "Cays." On the other hand, the Sooty Tern (more generally known in the West Indies as the "Egg-bird") invariably nests on the ground on a few weeds only. My correspondent's further notes I copy verbatim;—"I am not able to state positively as yet whether the Noddy lays one or more eggs. [Audubon, who visited a famous breeding-place of the Noddy on one of the Tortugas, called Noddy Key, off the coast of Florida, states that this bird, like the Sooty Tern, lays three eggs.—ED.] The eggs are gathered by the crews of two or three small schooners that leave here for the Cays in March or April, timing their departure so as to arrive just as the birds begin to lay. It often happens, however, that they find the birds in possession and sitting. The only way therefore to ensure getting fresh eggs is to break all they can see or even reach. After this they are taken as soon as laid. The

men say that on landing the birds fly up in immense numbers, and the nests are in such close proximity one with the other as to make it difficult to decide upon the number in each nest. The men, however, believe that they lay but one egg if not disturbed. This applies to the 'Egg-bird.' The Noddies refuse to leave their nests, and resist with open beak all attempts to dislodge them, and have to be forcibly removed to get at their eggs."—H. W. MARSDEN (Gloucester).

Manx Shearwater in Staffordshire.—A specimen of this bird, picked up alive in a village near here, was given to me on the 9th of September last.—E. W. H. BLAGG (Cheadle, Staffordshire).

Manx Shearwater in Herefordshire.—A Manx Shearwater was picked up on the 7th September last in the parish of Upton Bishop, near Ross. When found it seemed remarkably tame, and during the four or five days it was kept alive it made no effort to fly. It weighed 14 ounces, and measured $12\frac{1}{2}$ inches from tip of bill to end of tail. Though it would not feed itself it retained all that was put down its throat; chopped meat, sopped bread, and minnows were given to it. It refused fresh water, but when put into a bath of water in which Tidman's sea-salt had been dissolved, it drank readily. It appears to me that hurricanes are not the only cause of the appearance of sea-birds at a distance from the sea. Possibly they may change the east for the west coast by the most direct route, or if migratory species the land may lie between them and their destination. Gulls seem to do fairly well on the passage, but Petrels not so well, judging from several I have heard of being found dead and dying.—W. BLAKE (3, Myrtle Villas, Ross).

Sooty Shearwater at Flamborough.—Allow me to record the capture of a specimen of the Sooty Shearwater, *Puffinus griseus*, which was obtained near Flamborough, August 27th, and is now in the possession of Mr. J. Morley, birdstuffer, of this town, where I saw it the day after he had mounted it. A very dark specimen, in good plumage, was shot in the autumn of 1879, by Sir William Feilden, Bart., near Filey, and is now in his collection.—R. P. HARPER (2, Royal Crescent, Scarborough).

Note on the Tree Pipit.—In the last edition of Yarrell's 'British Birds' the Tree Pipit is described as having the legs, toes, and claws pale yellow-brown (vol. i. p. 574). A male and female which I procured this year, on the 14th May and the 11th June, had three parts pale brownish flesh and pale flesh with no brown shade respectively, the feet very slightly darker in each case. These colours were noted down at once, and I observed that they had changed slightly in a few hours. The legs finally dry to pale—almost transparent—yellowish brown, the feet being a shade darker, and the description in Yarrell was probably drawn up from a specimen in this condition.—OLIVER V. APLIN (Bloxham, near Banbury).

Male Tufted Duck retaining the Breeding-plumage.—A few years ago I winged a male Tufted Duck, which fell on the Black Lake at Sir A. Reed's, and was left to see if one of the other sex would join it; but it remained in single blessedness all the spring and summer, and surprised me by retaining its full breeding-plumage, only getting a little duller in August. This year I had three pinioned Tufted Ducks on water in front of the house here, two males and one female: two of them paired, and the other male was left by himself. About May the paired male began to show signs of summer plumage, and by June had completely changed into the dull chocolate dress; but the other male was just as bright and smart as ever, and even now (September 2nd) is in fair breeding-plumage, though during the last month he has got less white on the flanks.—J. WHITAKER (Rainworth Lodge, Notts).

Song of Chaffinch in Autumn.—I heard this bird singing for the first time this autumn, on August 1st, near Birmingham.—W. HARCOURT BATH (Ladywood, Birmingham).

Troglodytes parvulus a Migrant.—When we observe the habitually short flights taken by the Common Wren when disturbed, and examine its small and apparently feeble wings, it is difficult to understand how so diminutive and weak a bird can traverse wide open tracts where no trees exist, and even venture to cross the sea. Yet that it does so, both in spring and autumn, is evident from the returns received from the keepers of the lightships and lighthouses. In the last Report (the eighth) on the Migration of Birds issued by the British Association Committee (*vide antea*, p. 397) its appearance on the west coast of Scotland is noted (p. 69) at Turnbury on two different days in April, and at Skerryvore on May 6th. In September it was seen at Corsewell and Little Ross; in October at Rona, Skye, Skerryvore, Rhinns of Islay and Lochindaul; and in November at Little Ross. On the east coast of Scotland one was captured in August at the lantern at Inch Keith, in the Firth of Forth, and "great numbers" were seen at the Isle of May on the 21st and 24th October (p. 14). On the east coast of England in spring (March 24th) one came on board the lightship at the Outer Dousing, and was caught on deck, while seven of these little birds were killed against the Flamborough lighthouse on May 17th. In the autumn several were observed at the following lighthouses and lightships:—Cromer, Cockle, Leman and Ower, Spurn, and Farne (p. 32). This points to a regular migration of the Wren in spring and autumn—a fact which a few years ago would have been discredited as improbable. During the last week of September in the present year, when returning one evening from Grouse-hawking on Riddlehamhope Moor, Northumberland, I came unexpectedly upon a Wren making its way across the open moor, far away from all trees, and with no shelter of any kind except the heather in which

it was from time to time resting. This seemed strange enough, but how this tiny bird can manage to cross the sea *without a rest* is to me a greater wonder.—J. E. HARTING.

Report on the Migration of Birds.—As some of your readers may fail to find the “Llyn Wells” or “Llynwells” light-vessel, so often mentioned in the Reports of the Migration Committee on any map of the Welsh coast, where they would be most likely to search for it, it may be well to explain that the Lynn Wells light-vessel referred to is moored in the Wash between the counties of Norfolk and Lincoln.—T. SOUTHWELL (Norwich).

Tawny Pipit near Brighton.—A specimen of this rare visitor, the Tawny Pipit, *Anthus campestris*, was taken in a net close to the Ditchling Road, about a mile from Brighton, on August 25th, and upon dissection proved to be a male.—R. W. CHASE (Edgbaston, Birmingham).

[The number of rare Passerine birds (rare, that is, in England) which are captured by the birdcatchers near Brighton is very remarkable. In this locality *Anthus campestris* has occurred more frequently than in other parts of England, while its visits, always in autumn, have hitherto been confined to the southern counties.—ED.]

Long-tailed Duck in Cumberland.—The Long-tailed Duck, *Harelda glacialis*, was first obtained in Cumberland in November, 1834, since which date a very few immature birds have been killed upon the Solway and its tributaries. In 1884 a male bird was killed on March 19th, and I saw a small party on the Solway in the succeeding November. No others were heard of until the 10th October last, when an adult female bird was shot near Silloth, and forwarded to me through Mr. Duckworth. The date is earlier than any previously obtained in autumn.—H. A. MACPHERSON.

Purple Heron in Lancashire.—An example of the Purple Heron, *Ardea purpurea*, was killed, on the 7th April last, in the neighbourhood of Alderley Edge, about thirteen miles from Manchester. It was an adult male bird, and weighed 2 lbs. 4 oz.; width between the extended wings, 4 ft. 8½ in.; length from tip of bill to sole of foot, 3 ft. 10 inches.—J. PICKIN (83, Bridge Street, Manchester).

Crossbills in Kent.—In a note communicated to the ‘Rochester Naturalist’ for October, 1887 (p. 311), Mr. Henry Lamb reports that a pair of Crossbills, *Loxia curvirostra*, were shot near Maidstone in July last.

Open Nests of the Tawny Owl and Stock Dove.—*Apropos* of the remarks on this subject (p. 347) I may state that I found a Tawny Owl last year almost at the top of a spruce fir. This was in July. There were four eggs in the nest, which had evidently been deserted, as they were all addled, and much discoloured by exposure to the weather. This

nest was swarming with fleas. I once found a Stock Dove's nest with three eggs. Is this likely to be a case of two hens laying in the same nest, or had the same bird laid the three eggs?—G. E. LODGE.

Osprey captured in the Bristol Channel.—A female Osprey, in immature plumage, was taken alive on a boat in the Bristol Channel on Sept. 22nd. The owner kept it alive for ten days, but, as it was offered raw meat and refused to take it, it starved. Had fish been given probably it would have lived. It is now being preserved.—WM. SHAKESPEARE (Cardiff).

[It seems extraordinary that there should have been any difficulty in procuring fish so close to the Bristol Channel, unless the owner of the bird was ignorant of its species, and of the fact that its natural food is fish. It is a pity it should have been allowed to die of starvation. It might have been sent to the Clifton Zoological Gardens, where it would have been properly taken care of.—ED.]

Pectoral Sandpiper in Norfolk.—On Sept. 8th a specimen of the Pectoral Sandpiper, *Tringa maculata*, was shot on the banks of the River Bure, near Yarmouth. The man who shot it, not knowing what it was, took it to Mr. G. Smith, of that town, who identified the species, and sent the bird on to me. Sex, male; length from end of tail to tip of bill, 10 in.; extent of wings, $18\frac{1}{2}$ in.; weight, $2\frac{1}{2}$ oz., but fat. Contents of stomach undistinguishable, owing to its being badly shot. I may add that the bird was examined by Canon Tristram in the flesh. It has been beautifully set up by Cullingford, of Durham, and is a welcome addition to my collection.—R. W. CHASE (Edgbaston, Birmingham).

Gull-billed Tern in Belfast Lough.—It may possibly interest some of your ornithological readers to know that towards the end of September a specimen of the Gull-billed Tern, *Sterna anglica*, was shot in Belfast Lough. The bird was placed in the hands of Mr. Darragh, of the Museum of that town, and brought by him to me for determination. On consulting the last edition of Yarrell, I find that it does not appear to have been previously recorded from Ireland.—ROBERT O. CUNNINGHAM (Queen's College, Belfast).

CRUSTACEA.

Crustacea from the Channel Islands.—Mr. R. L. Spencer having lately presented to the Natural History Museum a small but well-preserved series of Crustacea from the Channel Islands, it may be of interest to note a list of the species, with remarks upon some of the more interesting types. The collection includes:—(1) *Stenorhynchus rostratus* (Linn.). (2) *Portunus corrugatus*, Penn.: interesting on account of its very extended geographical range; it occurs not only in the British Isles, but in the Mediterranean, the Azores, St. Vincent, and Cape Verde Islands, and has been repeatedly

recorded from Japan by De Haan, Dr. Stimpson, and myself; it is also one of the British species known to occur in the Australian Seas, specimens having been taken in Bass's Straits, E. Moncœur Island, 38 fathoms, by H.M.S. 'Challenger.' (3) *Portunus pusillus*, Leach. (4) *Pilumnus hirtellus*; Herm, near Guernsey. (5) *Ebalia tuberosa*, Pennant: a male and female of full size were obtained, in which the coloration is excellently preserved; the ambulatory limbs are very prettily spotted with red, and the abdomen of the female has six spots symmetrically disposed in two longitudinal series of the same colour. (6) *Corystes cassivelaunus*; Guernsey. (7) *Eupagurus berulardus* (L.). (8) *E. prideauxii* (Leach). (9) *Spiropagurus Anapagurus hyndmanni* (Thompson): Mr. J. R. Henderson, in working out the Anomymous Crustacea of the 'Challenger' collections, first observed that *Pagurus* (*Eupagurus*) *hyndmanni*, Thompson, *P. lævis*, Thompson, and *P. ferrugineus*, Norman (= *P. chrysacanthus*, Lilljeb.), presented a character akin to *spinopagurus* in the curved genital appendage attached to the coxal joint of the fifth (left) leg, which appendage, however, is not spirally coiled as in *spinopagurus*, and he established therefore for these species a new subgenus, *Anapagurus*. (Of the genus *Spinopagurus* the described species are *S. spiriger* (De Haan) from Japan; *S. dispar*, Stimpson, from the Barbadoes; *S. iris*, M.-Edwards, from the Barbadoes; and *S. elegans*, Miers, from Goree Island, Senegambia). (10) *Galathea strigosa*, L. (11) *G. intermedia*, Lilljeborg (= *G. andrewsii*, Kinahan): of this distinctly characterized little species there are specimens in the collection of the Natural History Museum from Dalkey Sound (Dr. Kinahan); Cumbrae; Benhaven; Balnesia (the Museum of Stockholm); Kenmare River, Ireland (Sir P. Egerton); and Vigo Bay, Portugal (W. S. Kent). (12) *Callianassa subterranea* (Montagu). (13) *Athanas nitescens* (Montagu). (14) *Alpheus megacheles*, Hailstone (a specimen in spirit, and a fine dried specimen from Herm). (15) *Idotea lunaris* (Pennant).—EDWARD J. MIERS.

HOLOTHURIOIDEA.

The Trepang Fishery.—An important fishery for a food product, although one scarcely known in Europe or the United States, is that carried on for Trepangs in the South Pacific and Indian Oceans, where it is found chiefly on coral reefs, from which it is gathered and imported in large quantities into China, where it is considered a great culinary delicacy. The Trepang is found in all latitudes, but hitherto the supply has come mainly from the islands of Oceanica, particularly New Caledonia. In Malaysia, the Ladrones, and the China Sea, thousands of junks are equipped annually for these fisheries. The island of Erromanga, in the New Hebrides, has long been an important shipping point for this product. The Trepang, or Beche-de-Mer, as it is often called,—another of its names being the Sea-cucumber,—is a rather repulsive looking animal, being a kind

of Sea-slug belonging to the genus *Holothuria*. There are several species. The ordinary kind which is used for food (*Holothuria edulis*) resembles somewhat a prickly cucumber in size and appearance, except that the colour is a light brown with a yellow belly. Another kind is black. Sometimes they are found nearly two feet in length; but they are generally much smaller, and about eight or ten inches may be taken as the average length. The Trepang, when prepared for market, is an ugly-looking brown-coloured substance, very hard and rigid, and can be eaten only after being softened by water and a lengthened process of cooking, when it is reduced to a sort of thick soup by the Chinese, who are very fond of it; and when cooked by a Chinaman who understands the art it makes an excellent dish, which the Europeans at Manila regard very highly. The preparation of the Trepang for market is simple. They are boiled in water, either salt or fresh, for about twenty minutes, and then slit open, cleaned, and dried. Those dried in the open air or sunshine bring a higher price than those dried over a wood fire, which latter is the usual process adopted by the Malays. Some varieties require boiling for only a few minutes, or till they become firm to the touch. They must be dried thoroughly, as they absorb moisture readily, and are then liable to become mouldy and spoil. No one has yet attempted this fishing in the North Pacific, although Trepangs abound in the waters along the north-western coast of America, particularly in the region of the Queen Charlotte Islands and the Alexander Islands of Alaska, as well as on the west coast of Vancouver Island. Some time ago an Indian brought me two good specimens, which he had caught at low tide near the end of the Mill Wharf at Point Hudson. I showed them to several Chinamen, who at once pronounced them to be the best quality of "Whetong," one of the Chinese names for the Trepang. When properly cured they are a valuable food product, and will sell in Canton for about forty-five dollars per ton. This indicates that there may be a deal of money in the business, if rightly conducted, as a cargo of a hundred tons could easily be cured at some places in a few months with a sufficient force of Indians to collect them. The cost is simply to gather the Trepangs at low tide, or have the Indians to do so, and then have them properly dried, which is an easy process, though one requiring some care and skill. A few inexpensive experiments will enable one to ascertain the correct way of preparing these slugs, which will be likely to find a ready and lucrative sale to the Chinese merchants.—J. G. SWAN (Port Townsend, Washington).—*From the 'Bulletin of the United States Fish Commission' for 1886, p. 333 (1887).*

ERRATUM.—At page 392 of 'The Zoologist' for September, the specific name for the Common Toad is inadvertently given as *calamita*. It should of course be *vulgaris*, *Bufo calamita* being the Natterjack.

SCIENTIFIC SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.

October 5, 1887.—Dr. SHARP, President, in the chair.

Mr. Jacoby exhibited a specimen of *Aphthonoides Beccarii*, Jac., a species of *Haltica* having a long spine on the posterior femora. He also exhibited a specimen of *Rhagiosoma madagascariensis*, and remarked that it had the appearance of a Longicorn.

Mr. Stevens exhibited a very dark specimen of *Crambus perlellus* from the Hebrides, which its captor supposed to be a new species.

Mr. Porritt remarked that this brown form of *Crambus perlellus* occurred at Hartlepool with the ordinary typical form of the species, and was there regarded as only a variety of it.

Mr. Slater exhibited a specimen of *Gonepteryx Cleopatra*, which was stated to have been taken in the North of Scotland.

Mr. Jenner Weir remarked that although the genus *Rhamnus*—to which the food-plant of the species belonged—was not a native of Scotland, some species had been introduced, and were cultivated in gardens.

Mr. South exhibited an interesting series of about 150 specimens of *Boarmia repandata*, bred in 1876, and during the present year, from larvæ collected on bilberry in the neighbourhood of Lynmouth, North Devon, including strongly marked examples of the typical form, extreme forms of the var. *conversaria*, Hüb., a form intermediate between the type and the variety last named, and examples of the var. *destrigaria*, Steph. Mr. South said that an examination of the entire series would show that the extreme forms were connected with the type by intermediate forms and their aberrations.

Mr. Poulton exhibited young larvæ of *Apatura Iris*, from the New Forest; also eight young larvæ of *Sphinx convolvuli* reared from ova laid on the 29th August last by a specimen captured by Mr. Pode in South Devon. Mr. Poulton said the life-history of the species was of extreme interest, throwing much light upon that of *Sphinx ligustri*, as well as upon difficult points in the ontogeny of the species of the allied genera *Acherontia* and *Smerinthus*.

Mr. Stainton commented on the interesting nature of the exhibition, and said he was not aware that the larvæ of *Sphinx convolvuli* had ever before been seen in this country in their early stages.

Mr. M'Lachlan remarked that females of this species captured on former occasions, when the insect had been unusually abundant, had been found upon dissection to have the ovaries aborted.

Mr. R. W. Lloyd exhibited two specimens of *Elater pomonæ*, and one of *Mesosa nubila*, recently taken in the New Forest.

Mr. Porritt exhibited a series of melanic varieties of *Diurnea fagella*, from Huddersfield, and stated that the typical pale form of the species had almost disappeared from that neighbourhood.

Mr. Goss exhibited, for Mr. J. Brown, of Cambridge, a number of puparia of *Cecidomyia destructor* (Hessian Fly), received by the latter from various places in Cambridgeshire, Norfolk, Suffolk, and Wiltshire. He also exhibited a living larva of *Cephus pygmaeus*, Lat. (the Corn Sawfly), which had been sent to Mr. Brown from Swaffham Prior, Cambridgeshire, where, as well as in Burwell Fen, it was stated to have been doing considerable damage to wheat crops.

Mr. Verrall, in reply to a question by Mr. Enock, said he believed that the Hessian Fly was not a recent introduction in Great Britain, but had been here probably for a great number of years. In reply to a further question, he admitted that he was unable to refer to any but recent records of its capture.

Prof. Riley said he was unable to agree with Mr. Verrall, and was of opinion that the Hessian Fly had been recently introduced into this country. Its presence here had not been recorded by Sir Joseph Banks, by Curtis (who paid great attention to farm insects), by Prof. Westwood, by the late Mr. Kirby, or by any other entomologist in this country who had given especial attention to Economic Entomology. It seemed highly improbable, if this insect had been here so many years, that its presence should have so long remained undetected both by entomologists and agriculturists. It had been stated that the insect was introduced into America by the Hessian troops in 1777, but this was impossible, as its existence at that date was unknown in Hesse.

Mr. M'Lachlan, Mr. Elwes, Mr. Verrall, Mr. Jacoby, and Dr. Sharp continued the discussion.

Mr. James Edwards communicated the second and concluding part of his "Synopsis of British Homoptera-Cicadina."

Prof. Westwood contributed "Notes on the life-history of various species of the Neuropterous genus *Ascalaphus*."

Mr. Elwes read a paper "On the Butterflies of the Pyrenees," and exhibited a large number of species which he had recently collected there.

Mr. M'Lachlan said he spent some weeks in the Pyrenees in 1886, and was able to confirm Mr. Elwes' statements as to the abundance of butterflies. He remarked on the occurrence of Spanish forms in the district, and on the absence, as a rule, of the peat-bogs so common in the Swiss Alps. The discussion was continued by Mr. Distant, Mr. White, Dr. Sharp, and others.—H. Goss, *Hon. Secretary*.

NOTICES OF NEW BOOKS.

The Mammoth and the Flood: an attempt to confront the theory of Uniformity with the facts of recent Geology. By HENRY H. HOWORTH, M.P., F.S.A., &c. 8vo, pp. 464. London: Sampson Low & Co. 1887.

MR. HOWORTH'S lately-published volume, while dealing with exceptionally curious facts, and dealing with them, moreover, fairly on their merits, will be regarded by many as an unorthodox book. In it we find the so-called Mosaic cosmogony referred to as "a collection of Babylonian legends," and Lyell's theory of Uniformity is regarded as an unverified hypothesis which fails to account for the extinction of the Mammoth and the animals which perished with it. But perhaps the most remarkable feature of the work is the evident desire on the part of the writer to "throw cold water" on the Glacial Epoch, and to substitute for the "action of ice" the almost equally powerful "action of gigantic floods," not caused by deluges of rain, but (if we may generalise from the author's conclusions at p. 354 with respect to the Pampas of South America) by the sudden elevation of vast mountain ranges.

A large portion of the book is occupied with an overwhelming array of facts relating to the condition in which the remains of the Mammoth and other monster mammals have been found. Some of these facts are very remarkable. The Mammoth appears to have been a resident in the forests of Siberia and Europe north of the Pyrenees, in an age when pine trees grew on the shores of the Arctic Ocean, and the climate was much milder than it is now. It lived contemporaneously with the mammals now inhabiting those regions, and with others which like it have become extinct, such as the Rhinoceros and Hippopotamus. It was not destroyed by man, nor by beasts of prey, but by a deluge which overwhelmed it and its contemporaries with mud, and which was accompanied by sudden cold, which in some cases froze the carcasses before they had time to decompose. During the thousands of years which have elapsed since this catastrophe, the frost has never been relaxed in the high north. Surface-thaws take place every

summer, but beneath this the frost has been uninterrupted. This catastrophe not only destroyed the Mammoth, but it also overwhelmed Palæolithic Man. Between the remains of the Mammoth, the Rhinoceros, and the rough flint implements of contemporary man, and the finely-cut flints of Neolithic Man which are found with remains of rude pottery and the bones of *Bos primigenius*, there is a great hiatus. The Old Stone Age did not gradually pass into the New Stone Age by insensible degrees, but there is abundant evidence that in these latitudes the earlier races of man were exterminated by a catastrophe, and thousands of years afterwards Northern Europe and Siberia were peopled by a new race of men who had attained a considerably higher degree of civilisation when they emigrated thither than were possessed by the race of men which lived there ages before.

In North America the Mammoth ranged across Alaska to the Mackenzie River, and its remains are found under precisely the same conditions as those of the Old World, except that there is a considerable difference in the animals with which it is associated.

But the evidence of a great deluge is by no means confined to the northern hemisphere. The Mastodon and the Giant Sloth of South America tell precisely the same story as the Mammoth and Rhinoceros of Siberia. "The whole area of the Pampas is one wide sepulchre for these extinct animals" (Darwin, 'Voyage of the Beagle,' iii. p. 155). According to d'Orbigny (quoted on p. 352), "It would seem that the cause which destroyed the terrestrial animals of South America is to be found in great dislocations of the ground, occasioned by the upheaval of the Cordilleras; otherwise it is difficult to understand on the one hand the sudden and fortuitous destruction of the great animals which inhabited the American continent, and on the other the vast deposit of Pampas mud."

Unfortunately Mr. Howorth stops short at the most interesting point—the bearing of all this evidence on the theory of one or more glacial epochs, exactly as the first volume of a novel leaves the hero at the most critical period of his history. We must not, however, complain, inasmuch as we are promised a second volume, in which will be discussed the purely geological side of the argument. All we can do at present therefore is to

anticipate his conclusions, and accept or refute them as the case may be.

The Andes and the Himalayas are the highest mountains in the world, and therefore are presumably the most recent. Their sudden upheaval may almost have shaken the world, if not to its centre, at least to its circumference, and may have caused the catastrophe handed down to us in the legends of every nation as the "Great Flood." This deluge may have destroyed the monster mammals which became extinct at the end of the Pleistocene Age, and may have nearly exterminated Palæolithic Man; but there may, and there must have been, a Post-Pliocene, and probably a Præ-Pliocene, Glacial Epoch before the Flood. To say nothing of the impossibility of accounting for the present geographical distribution of mammals and birds, or any other theory, the distribution of human remains demands a Glacial Epoch as well as a Great Deluge. If the latter destroyed Palæolithic Man, what becomes of the overwhelming evidence in support of the theory that at least nine-tenths of the Palæolithic flint implements are Post-Glacial? The evidence clearly points to the fact that Palæolithic Man lived for the most part after the Post-Pliocene Glacial Epoch, and before the Pleistocene Deluge, a period which may have lasted forty thousand years.

Mr. Howorth's most interesting and instructive book shows pretty conclusively that the uniformity of geological events has been now and again broken by catastrophes of enormous magnitude, and to this extent the evidence which he has collected is valuable. But philosophers are prone to jump from one extreme to the other, and Mr. Howorth is apparently no exception to the rule. If the disciples of Lyell have erred in carrying too far the theory of Uniformity, and have tried to twist every fact in conformity with it, Mr. Howorth errs in not carrying it far enough, and would have us account for everything by his theory of a catastrophe. We willingly accept his theory of a Great Deluge, but we cannot forego our belief in Glacial Epochs. The evidence of the one is as indelibly imprinted on the universe as that of the other, and, unless he can bring forward in his promised second volume some facts which are inconsistent with this belief, we must continue to place credence in both.





